

NASA TECH BRIEF

Langley Research Center



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Bonded Panel, Flaw Detection Standards

A process has been developed for preparing standards for use, with optical holography or ultrasonic equipment, in the detection of flaws in bonded panels.

The test panels consist of several, small unbonded areas between two bonded sheets. The unbonded areas contain very little entrapped air, in order to simulate some bonding failures that could occur in service. As the standards were to be used with an ultrasonic flaw detector, it was essential that no foreign materials which promote unbonding could be used, as they might affect ultrasonic signal transmission.

Metal-to-metal, composite-to-metal, and composite-to-composite flaw standards have been produced by this process, and all have been used and tested successfully.

The unbonded areas in the flaw standards are made by cementing pieces of epoxy skin to the surface of one of the two plates to be bonded. The skin pieces are somewhat larger than the desired flaw and are

attached by epoxy cement carefully spread in a thin film around each unbonded area. The patches of epoxy skin are pressed and rolled to remove as much air as possible. The illustration shows a standard under construction, with the patches of skin cemented to a sanded and cleaned aluminum plate.

The test standard is completed by bonding a second plate to the first. The resulting standard consists of two bonded plates, with a 0.006-inch (0.016-cm) thick bond line of epoxy cement and the known unbonded areas adjacent to the first plate.

The epoxy film used for the flaws is obtained by pressing epoxy adhesive, similar to that used for final plate bonding, between metal blocks. Tedlar film, or its equivalent, is used to prevent the epoxy from sticking to the blocks. This film usually has small holes, due to air bubbles, which must be sealed. To accomplish this, a second application of epoxy cement is necessary, plus more pressing between the metal blocks. The finished epoxy film is approximately 0.002 inch (0.005 cm) thick.

Note:

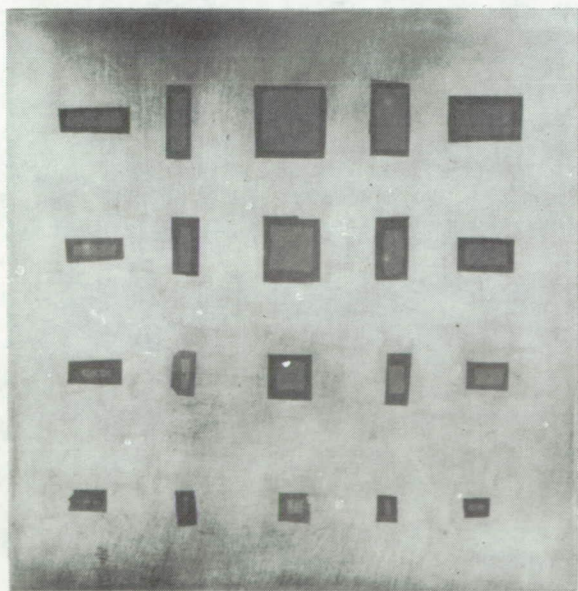
No further documentation is available. Specific questions, however, may be directed to:

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Reference: B73-10240

Patent status:

NASA has decided not to apply for a patent.

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8- by 8- by 0.025-Inch Aluminum Sheet With 20 Epoxy Patches.